

Marx's *Capital* in Symmetry

The doctoral dissertation founds his life time project*

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'Reciprocal division genetically constitutes continuity.'

Hermann Weyl

1. Marx's Critique against Kant Concludes with 'Symmetry'

Marx's critique of political economy is not a kind of economics. Marx aimed to constitute *Capital* as 'an aesthetic whole'. In order to know the back ground of his criticism, it is indispensable to read philosophical works that Marx criticized. Generally, when the philosophy of Marx is mentioned, Hegel is used to be associated automatically. However, Marx read Hegel, inquiring whether or not Hegel criticized correctly Kant, the founder of German classic philosophy. The problematic provides the key to enter the world of Marx's 1841 doctoral dissertation, 'The Difference between Democritean and Epicurean Philosophy of Nature'.¹ Moreover, Marx continued to research the Kant problem until his death in the 1880s. Marx left huge manuscripts on mathematics of about one

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1 The doctoral dissertation is abbreviated hereafter as *The Difference* or the doctoral dissertation. *The Difference* by Marx follows not only Hegel's title *The Difference between Fichte's and Schelling's System of Philosophy* [translated by W. Cerf and H. S. Harris, Albany, State University of New York Press, 1977], but also Hegel's critique there against Kant, especially Kantian antinomy. The cancelation (Aufhebung) of antinomy shapes symmetry. See note 3.

thousand pages that were written between 1860s until 1880s,² in that he wrote the following.

‘In just such a manner Fichte followed Kant, Schelling Fichte, and Hegel Schelling, and neither Fichte nor Schelling nor Hegel investigated the general foundation of Kant, of idealism in general: for otherwise they would not have been able to develop it further’.³

Marx asserted that none of the philosophers after Kant engaged in the proper subject of the radical criticism against Kant’s epistemology. As seen afterwards in next 2, the main subject of Marx’s doctoral dissertation is the total criticism against Kant of *Critique of Pure Reason*; that subject has been left unread amongst Marx Scholars. Marx argued in *The Difference* that Kantian epistemological structure that consists of three elements of sensuousness, understanding and reason had already had been destroyed more than two thousand years before in the philosophy of nature by Democritus and Epicurus. Moreover, Kant’s four antinomies had been superseded by Epicurus: antinomy between *infinity* and *finiteness*, between *the whole* and *part*, between *freedom* and *natural necessity* and between *theism* and *atheism*. Marx did not leave the antinomies unsolved as semblance (Schein) like Kant, but sought the superseded form of them as *symmetry*.⁴ It is noteworthy that ‘symmetry motif’ in *The Difference* had lead Marx not only to critique of political economy since Autumn 1843 in Paris, but also to study of mathematics since 1860s.

2. Dissolution of Kantian Epistemology

Scrutiny of Marx’s preparatory seven notebooks for *The Difference* is vital to reveal what is its main subject. Marx documented his research of the subject in the notebooks for his personal use. The microscopically careful reading of the notebooks shows that the subject is critique against Immanuel Kant’s *Critique of Pure Reason*. Methodologically, Marx projects his own criticism against Kant (1724~1804) onto the ancient classical natural philosophers, Democritus (BC460ca~BC370ca) and Epicurus(BC341~BC270). Then he finds that three elements of Kantian epistemology of sensuousness, understanding and reason had been destructively separated amongst the two philosophers. He uses his unique method of projection of his own problematic onto history of the origin throughout his life time to other thinkers of Aristotle, Spinoza and Adam Smith etc., leaving unique notes, for instance, of Aristotle’s *De Anima*, Spinoza’s *A Theologico-Political Treatise* and Smith’s *Wealth of Nations* [see MEGA, IV/1.1, IV/1.2, etc.].

In the seven notebooks, especially in the first, Marx traces the destruction of Kantian epistemology in Democritus and Epicurus as flows.

While Democritus rejects *sensuousness* as unreliable and seeks objects of *understanding*, leaving

2 *The Mathematical Manuscripts* were not written between 1870s and 1880s as the editor of the manuscripts had assumed, because Marx wrote *The 1863–65 Manuscripts of Critique Political Economy*, utilizing many mathematical terminologies: that is very characteristic in comparison with *The 1861–63 Manuscripts* in that mathematics had not worked as analytical tool.

3 Marx’s *Mathematical Manuscripts*, translated by C. Aronson, M. Meo, and R. A. Archer, New Park Publications, 1983, p.119. The citation gives evidence that Marx read Hegel’s *Difference* (1801). See Note 1. Moreover, Marx must have read Hegel’s article ‘Faith and Knowledge’ (1802), in that Hegel continued the critique against Kant. Marx probably came to know there ‘Incommensurability (asymmetria)’ and metaphor ‘mirror (Spiegel)’ that brings symmetry. See Hegel Werke 2, Surhkamp 1970, S.350–351, S.402–403.

4 See Hermann Weyl, *Symmetry*, Princeton University Press, 1952.

home in search of further empirical facts, and lastly recognizes his own ignorance, Epicurus is confident of *sensuous experiences* and is satisfied with what he comes to know by *sensuousness*, but indifferent to *understanding*. Both of them consider that atom or extremely finite existence is conceivable only with *reason*. Therefore, the three moments of Kantian epistemology of sensuousness, understanding and reason are separated within each thinker, and the separations are symmetrically different; sense is affirmative to Epicurus, negative to Democritus, and understanding is affirmative to Democritus, negative to Epicurus, and for both of them, reason is separated from sensuousness and understanding and is only active in conception of atom. Hegel demonstrated how Kantian antinomy supersedes itself in symmetrical working of reason both in the book *The Difference* (1801) and the article 'Faith and Knowledge' (1802).⁵

While Kant treats reason in dualistic separation of ideality and reality, of subject and object and of finite and infinity, Hegel defines reason as productive imagination (*Einbildungskraft*), ironically, referring to Kant's first edition (A) of *Critique of Pure Reason*, that gives rise sensuousness and understanding and commands them in way as, when understanding defines something (S), reason supplements its working so that S is possible to define so long as remain or undefined 'non-S' is referred as preposition of S as 'non-non-S'. S and non-S occupy the whole logical space that spreads to infinity, therefore there is no vacancy. Thus, reason operates in order to let both S and non-S mutually to correspond in symmetry. Hegel's reason finally returns to itself as the absolute ideal identity that maintains manifestation of real differences in symmetry.

Hegel discusses in his article 'Faith and Knowledge' (1802) the circle in Spinoza's letter of No.12, where Spinoza gives example of circle that includes smaller circle inside, but the two circle do not share common central point, in order to explain infinity within finite.⁶

Spinoza describes in the letter No.12 the implication of the two circles, writing 'the whole number of variations of finite unequal distance between the two circles and that of materials in motion (materia in eo mota) inside the finite marginal space around the two circles transcend any kind of number, that is, infinity.' Marx's note in the Berlin period of the letter of Spinoza⁷ gives philological evidence not only that he had read Hegel's article, but also that he was interested in the relation between infinity and finite, that is, the question of Kantian antinomy. The definition of infinity inside finite by Spinoza is the same with capital value in movement in Marx's *Capital* (M-C...P...C'-M'). Hegel argues that error or falsehood is relative based on Kantian separation and the absolute identity settles the question by transforming them into truth. Marx wonders if it is true. Rather he thinks that the absolute identity as represented by God or money is false. Common people worship 'substance' embodied in religious icon or money. He thinks that the prevailing human relationship is mutual deceiving one organized by religious imagination or money. The image in his doctoral dissertation maintains to the *Grundrisse* and *Capital*. So-called substance is not true basis of human life. Even Spinoza's substance in his *Ethics* must be object of Marx's examination. Later in his 1850s

5 See English translation by Cerf and Harris, Albany, State University of New York Press, 1977. Martin Heidegger paid attention to the first edition (A) in his *Kant and the Question of Metaphysics* (1927) that stimulated the Japanese philosopher Kiyoshi Miki to write *Logic of Imagination* (*Logik der Einbildungskraft*) during the Asia-Pacific War time (1931-45).

6 See Hegel Werke 2, S.349-350: English translation by Cerf and Idarris, p.111.

7 See MEGA, IV/1, S.271.

letter to F. Lassalle, recollecting his 1841 doctoral dissertation, he writes that even Spinoza's philosophical system is up-side-down. Then, the investigating order must be contrary. The order of demonstration in Marx's *Capital*, from simple commodity as 'mode' by way of two factors of use value and exchange value as 'attributes' to value as 'substance', implies his critique against the contrary order in the system of *Ethics* by Spinoza of 'substance' via 'attribute' to 'mode'. Spinoza's order and Marx's take form of symmetry: [substance→attribute→mode] : [mode→attribute→substance]. For Marx, the given world is dark night. Nothing is obvious. His life time long critique is exhausting attempt to discover light of nature, or truth.

3. Kantian Four Antinomies in Marx's Note for *The Difference*

The first note includes the following sentences that provide evidence of Marx's interest in the four antinomies of Kant's *Critique of Pure Reason*.

As to Antinomy 1 (whether there is beginning in time and limit in space, or not), the first note reads,

'The universe is **unlimited** by reason of the multitude of bodies and the extent of the void.' (MEGA2, IV.1, p.17; MECW, vol. 1, p.411: bold citor)

As to Antinomy 2 (whether the universe constitutes of part or it is just the whole),

'Since they [atoms] have **a certain size**, there must be something smaller than they are. Such are the **parts** of which they are composed. But these are necessarily to be considered together as permanent community' (MEGA2, IV/1, p.19; MECW, p.412; [] citor).

As to Antinomy 3 (whether human being is free or determined by natural necessity),

'*Necessity*, which has been introduced by some as the ruler over all things, is not the ruler... over that *some of which depends on chance* and some on our arbitrary *will*. *Necessity* is not subject to persuasion; *chance*, on the other hand, *is inconstant*. But our *will* is *free*' (MEGA2, IV/1, p.13, Apparatus, IV/1, p.600; MECW, p.408; italics original).

Antinomy 4 (whether there is absolute necessary being [God] or not; or which is true theism or atheism),

'**Gods** verily there are. For the notion of them is evident.Not the man who *denies the gods* worshipped by the multitude, but *he who affirms of the gods what the multitude believe about them is truly impious*. For the *utterances of the multitude about the gods* are **not true preconceptions, but false assumptions**.' (MEGA, IV/1, p.11-12; MECW, p.406; italics original)

Kant argues that even if there is beginning in time, something may be *before* the beginning, thus follows retrogressing infinitely, and in the same way, if there is limit in space, there may be something *beyond* the limit, thus follows progressing infinitely. To set beginning or limit is to give rise contradiction between finiteness and infinity that Kant calls 'semblance of reason (Schein der Vernunft)'. Kant rejects to assume relationship between time and space, writing there is no sum of temporal succession (Nacheinander) and simultaneous coexistence (Nacheinander) in his demonstration of antinomy one.

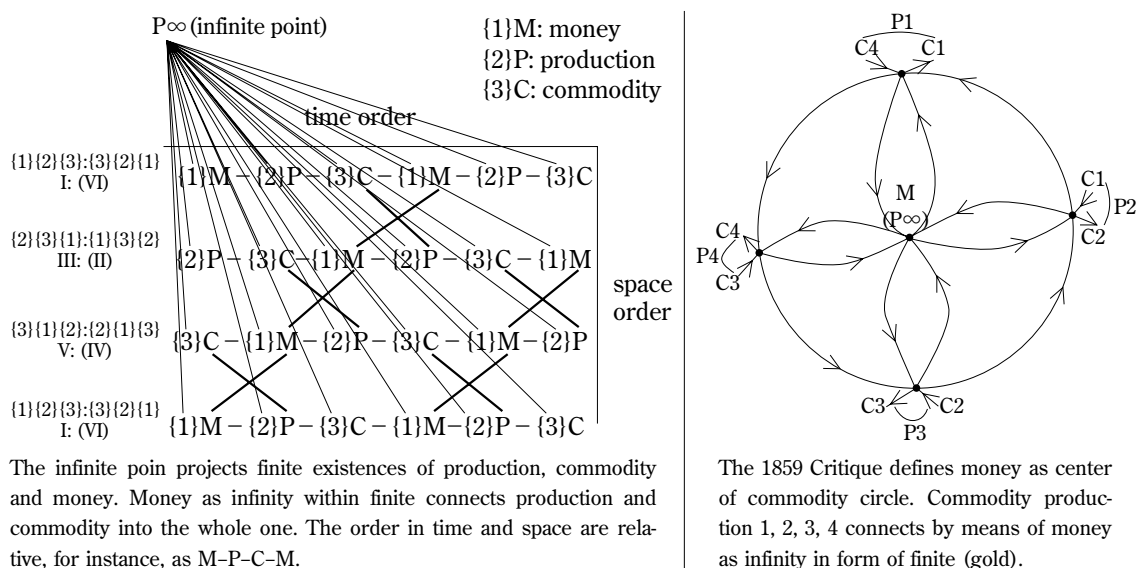
Criticizing in his book *The Difference* Kantian radical separation in antinomy, Hegel locates error or falsehood relatively in cognitive structure, arguing 'separation of subject and object is partially posited in knowledge and the separating activity is reflecting; that cancels the identity of subject and object, and the absolute, so long as it is considered for itself. And any recognition would en-

tirely be an error [ein Irrtum], so long as separation exists in recognition. Through this aspect that cognitive operation is separation and its result is a finite, any knowledge is limited so that it becomes falsehood [Falschheit]. However, any knowledge is simultaneously an identity, so no absolute error is given'.⁸ Aristotle had already mentioned that separation (chōrismos) may bring falsehood through wrong connection (synthēsis) of unrelated things in *De Anima* to that Marx paid attention in his note of the work for preparation of his doctoral dissertation.⁹ *De Anima* may also basis Hegel's argumentation above. Both Hegel and Marx are Aristotelians in that sense.

While, Marx argues, Epicurus had already settled the antinomies, by interconnecting finite atom (Atom) and infinite emptiness (Leere) as 'finite existence that involves infinity inside'. Atom is *finite-ness* that involves infinity, because atom includes other outside atoms *infinitely* by means of emptiness, and is simultaneously included inside other atom by mediation of emptiness. Therefore, atom is *set* that includes other atoms as *element* and is simultaneously *element* as being included in other atoms. Epicurus demonstrates such *symmetry of set and element*. The interconnection of atoms *necessarily* develop to the heavenly moon that multitude worship as *god* : that is, *partial* atom lastly develops into the *religious* object of *the whole* existence and the heavenly existence testifies Epicurus' tranquility (*ataraxia* or mental *freedom*) and he refuses the consequence as *atheist*. Thus, the four contradictions supersede themselves in symmetry and cease to exist lastly.

While Kant prohibits human speculation to go beyond of empirical facts, Marx finds the antino-

Figure I : Temporal Succession and Simultaneous Coexistence under the Infinite Point



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⁸ Hegel, *Differenz des Fichteschen und Schellingschen System der Philosophie*, Hegel Werke 2, S.95-96 : English translation citor in reference to English translation cited in foot note 1, p.156.

⁹ See Hiroshi Uchida, Whether Marx's Misunderstanding of Hegel's Texts, or Marx's Projection of his own Problematic on them? [Review article of Norman Levine, *Marx's Discourse with Hegel*], Senshu Economic Bulletin, No.114, March 2013, Tokyo (in English).

mies in actuality, gazing the fact that people are in daily life trapped in such semblances of religion or money as infinite existence. The theoretical task is to analyze the cause and structure of such semblances. Figure I at page 99 shows what Hegel calls ‘the infinite focus (der unendliche Fokus)’ in *The Difference* ¹⁰ shadows light on any point of time and space relatively.

Hegel writes, as follows,

‘The original identity of the absolute, or the unconscious contraction of feeling subjectively and of matter objectively, spread in the endless organization of temporal succession and simultaneous coexistence (Neben- und Nach-einander) of space and time, or in the objective totality’ ¹¹

While Kant argues in *Critique of Pure Reason*, that it is impossible *Nebeneinander* and *Nacheinander* are compatible with each other, Hegel criticizes Kant that Kant’s rejection brings about only separation of reality within ideality that destroys synthesizing working of reason par excellence or productive imagination (die produktive Einbildungskraft). Marx follows Hegel, insisting that *Nebeneinander* and *Nacheinander* in economic categories are compatible with capitalist economy, ¹² as shown in Figure I at page 99.

4. Redefinition of Kantian Parallogism as Reification (Versachlichung)

Marx does not think that philosophical developments that philosophers intended to bring are receivable just as they are ; rather he must find ‘the rational kernel’ hidden inside philosophical works that philosophers are unaware of. That is Marx’s method of critique. His first engagement in the critique is the doctoral dissertation where he writes as follows.

‘Its [historiography’s] concern is to distinguish in each system the determinations themselves, the actual crystallizations that pervades the whole system, from the proofs, the justifications in argument, the self-presentation of the philosophers as they know themselves ; to distinguish the silent, persevering mode of real philosophical knowledge from the voluble, exoteric, variously behaving phenomenological consciousness of the subject which is the vessel and motive force of those elaborations’ (MEGA2, IV/1, p.695 ; MECW, vol.1, p.506).

Marx’s methodology of text reading focuses on ‘the actual crystallizations pervading the whole system’ that most of philosophers themselves are usually unconscious ; rather their subjective intellectual interests rest on other aspects. From Marx’s critical viewpoint, most philosophers deceive themselves.

Then, in what form are the actual crystallizations buried? They exist in reverse forms. Here in the dissertation atom signifies human self-consciousness. How is it possible to analyze? The unaware self-consciousness in unity ‘lie mutually’. The critical view on such deception of self-consciousness opens way from scientific description of philosophy to historical existence, because actuality must be recognized not only as historical existence but also as philosophical potential. Interestingly from the viewpoint of the formation of Marx’s *Capital*, he criticizes Kantian examples of god and money

10 See Hegel, *The Differenz*, Hegel Werle 2, S.46 : English translation by Harris and Cerf, p.111.

11 See Hegel, *The Differenz*, ibid., S.112 : English translation by citior in reference to the translation by Harris and Cerf, p.170–171.

12 See, for instance, *Das Kapital*, Erster Band, Dietz Verlag Berlin 1962, S.107. See also *Kritik der politischen Ökonomie*, MEW, Bd.13, S.75.

as ones of mutual deception, as follows.

'Kant's example [of 'one hundred Taler' in his *Critique of Pure Reason*] ¹³ might have enforced the ontological proof. Real Talers have the same existence that the imagined gods have. Has a real Taler any existence except in the imagination, if only in the general or rather common imagination of man? Bring **paper money** into a country where this use of paper is unknown, and everyone will laugh at your subjective imagination. Come with **your gods** into a country where other gods are worshiped, and you will be shown to suffer from fantasies and abstractions.' (MEGA2, I.1, p.90 ; MECW, vo.1, p.104 ; bold letter citor).

Actuality is not given to human beings immediately in bare existence but appears to them through their imagination. It does not always bring things as they really are ; rather it presents things in reified form. The examples that Marx gives are gods and money. The God that Christian believes is different from gods that non-Christian does. Paper money is not valid where people do not use ; it is just a paper on that something unfamiliar is printed. Communal imagination among people makes it possible to buy things with. Such viewpoint makes each worldview relative. What seems to be true to someone may be false to another. Thus it becomes clear that the subject that Marx tackles in the doctorate dissertation is truth-falsehood problem. For Marx, status quo is object of radical criticism.

The truth-falsehood problem takes form of inquiry into reification (*Versachlichung*) as shown in his comments in his note of Aristotle's *De Anima* for the preparatory study for the dissertation. Interestingly, Marx firstly reads the last chapter on *nous* and sometimes writes comments. Marx inquires in the notes what determines truth or falsehood, relating Kantian parallogism that human reason (*Vernunft*) may reverse 'ideality' into 'reality' just in the same way of Descartes thesis, *cogito ergo sum* : here *cogito* (I think) is the transcendental Subject X that is just *ideal* par excellence, *sum* (I exist) signifies *real* existence. Kant argues that Descartes inverses ideal *cogito* (I think) into real *sum* (I exist) by means of *ergo* (therefore) : Kant defines *ergo* is 'fallacy of ambiguous middle'. Marx comments in his note of Aristotle's *De Anima*.

'It is entirely correct from every viewpoint when Aristotle declares that synthesis [connection] is the ground of all falsehood. Representing, reflecting thought is generally a synthesis [connection] of being and thought, that of generality (*die Allgemeinheit*) and individuality (*die Einzelheit*), and that of semblance [*Schein*] and essence [*Wesen*]. Then, further all incorrect thoughts exist as well as incorrect representation, consciousness etc. of synthesis of such determinations that do not belong to each other, being external in themselves, and are not immanent relationship of objective and subjective determinations' (MEGA, IV/1, p.164 : citor's English translation).

Marx confirms above that human capability to think (*nous*) does not always see things as they really are ; rather it arbitrarily connects things that have no connection by nature. Further in the note of *De Anima*, Marx comments as follows.

'Generally, just in the same way that *chōrista ta pragmata* (thing [*Sache*] is separable), or thing [*Sache*] exists in and for itself from matter [*Materie*], **(that is, things [*Dinge*] in themselves are separated from matter, or are separable through abstraction)**, thus behaves what are

13 See Kant, *Kritik der reinen Vernunft*, Felix Meiner Verlag, Hamburg, 1971, p.572 (A599, B627) ; *Critique of Pure Reason*, trans. by J. M. D. Meiklejohn, Dover Publications, Inc., 2003, p.335-336.

for *nous*' (ibid., S. 163 ; citor's English translation ; bold letter and () original).

Nous separated from essence speculates to fall in falsehood (*pseudos*), but nous that is itself essential is true (*aleteia*).¹⁴ That is, human arbitrary speculation may separate factum as result of human action (Tatsache) from the actor and connect with something another. The connection corresponds to Descartes' *ergo*. One *real fact* and another may be connected by means of *ideality*. Both of them stand in *symmetry of reified forms*. Later in *Capital*, Marx writes that goods owner in exchange unconsciously *abstracts* concrete use value to *separate* value ; value then mediates the different use value. Thus, goods become exchangeable commodity in symmetry with double attribute of use value and value.

5. Symmetrical Reflection of Pseudo Self-consciousness

As already seen in Marx's critique against Kantian antinomy, the principle of *The Difference* is connection of atom and emptiness ; that Marx calls 'crystallizations'. Crystal constitutes symmetry. One atom connects with another by means of emptiness. The mode of connection of atom maintains its own symmetry like as $[++\{^{**}(\cdot)^{**}\}++]$. That founds the principle of Marx's ontology since *The Difference*. Atom signifies pseudo self-consciousness that deceives with each other unconsciously. It reflects itself on other and vice versa. Self-consciousness reflects with each other as many times as number of subjects and reflective subject returns itself as multi-mirroring. Multi-structure of reflections forms symmetry in circular system.

Atom or self-consciousness constitutes interconnected structure in symmetry. Self-consciousness reflects its partner inside itself. It involves the whole reflecting process. Just like as Hegel's 'Für-sich-sein or Being-for-itself' is the philosophical definition of modern person, so the atom in *The Difference* is also modern self-consciousness.¹⁵

Notably, Hegel already utilized metaphor 'mirror (Spiegel)' when he writes, 'Like as mirror (Spiegel) has received common reality in common empiricism and has posited it ideally within itself, so it later again returns the common reality. The returning or naming what wants want (was dem Mangel mangelt) is called immanent transcendental deduction'.¹⁶ As to 'what wants want', the verb 'want(s)' signifies (a) to fulfill something lacked and the noun 'want' (b) something lacked to be fulfilled. Therefore, (a) and (b) compose symmetry. Hegel's immanent transcendental reason works like mirror that reflects multi-strata symmetry.

Judging the philological facts that Marx took notes of Spinoza's letters for preparation of the doc-

14 Interestingly, in his doctoral dissertation, Marx uses the term 'imaging understanding (der imaginierende Verstand)' (MEGA2, I, S.17), probably based on the second (B) edition of Kantian *Critique of Pure Reason* where he connects Imagination with Understanding, changing the definition in the first (A) where imagination is most basic that gives rise both of sensuousness and understanding.

15 Cf. Peter Fenves, Marx's Doctoral Dissertation on Two Greek Atomists and the Post-Kantian Interpretation, *Journal of the History of Ideas*, 1986, Vol. XLVII, No. 3. Fenves' article is monumental as the first to point out that the subject of Marx's doctoral dissertation is his critique against Kant.

16 Hegel, *Glauben und Wissen oder Reflektionsphilosophie der Subjektivität in der Vollständigkeit ihrer Formen als Kantische, Jacobische und Fichtische Philosophie*, in Hegel Werke 2, Suhrkamp, 1970, S. 402-403 : English translation citor's in reference to 'Faith and Knowledge' translated by W. Cerf and H. S. Harris, Albany, State University of New York Press, 1977.

torate dissertation, including his letter of No.12 to Mayer of 1663 that contains figure of two circles one of that includes smaller one within but they do not share the same center point for explanation of 'infinite inside finite', Marx probably came to know the letter of Spinoza to Mayer, by way of reading Hegel's article 'Belief and Knowledge'. Marx's metaphor of 'mirror (Spiegel)' in his *Capital* probably originates from the article by Hegel.

Reflecting in German word is *Spiegelung* (S), or literally *mirroring*. In the reflection between Self-consciousness(a) [abbreviated as (Sa) that also implies *Spiegelung* of (a) and (b) (Sb), Self-consciousness (b) is preposition for Self-consciousness (a), the order of reflection is written as [Sa (Sb)]. For Self-consciousness (b), the reflecting process appears as [Sb (Sa)]. Both processes are in symmetry as [Sa (Sb)] : [Sb (Sa)].

The reflecting process may continue endlessly. Among three self-consciousnesses (a,b,c), the mirroring process is written as

【«Sa[Sb(Sc)]» : «Sc[Sb(Sa)]»】

The reflecting may be infinite, as Epicurus says that atom moves eternally. As successive process of reflection continues infinitely, reflected image becomes smaller in multi-structure of reflecting and being reflected and abstracts its own concreteness into nothingness.

Marx's critique against Kant in the doctoral dissertation has brought about the principle of critique as symmetry of superseded form of antinomy or contradiction with that Marx will constitute his life time work *Capital*. When he characterizes use value of commodity as value-mirror (Wertspiegel) at the head of *Capital*, that presentation signifies that the structure of commodity world is mutual mirroring process, and that concreteness of use value is abstracted into value through the infinite reflecting process. Use value is concrete and finite by nature and value is infinity in its birth. Commodity is unity of finiteness (use value) and infinity (value), or finiteness that involves infinity. Thus, commodity in *Critique of Political Economy* of 1859 or in *Capital* of the 1867 first edition is re-definition and reconsideration in economic terms of atom in *The Difference* of 1841.

6. What is the Principle of *Capital*?

At the second section of the first chapter of volume one of *Capital*, Marx remarks,

'The twofold nature of the labor [use value and value] that is contained in commodity' is 'the pivot on which a clear understanding of political economy turns.'¹⁷

The understanding of double nature of human living labor is vital to comprehension of Marx's critique of political economy; as *concrete useful labor* it produces use value, and simultaneously as *abstract human labor* it founds commodity exchange as substance of value. Now he presents how *value* and *use value* become elements of principle to constitute *Capital*. Value and use value are key words to organize to the principle in the following way; the third section on *value form* of the first chapter demonstrates that *value* of a commodity reflects itself on *use value* of other commodity. Here value is positive subject and use value is passive predicate, written as [**value (use value)**]. The next section four introduces into *commodity fetishism* in that use value of commodity turns into subject that involves value inside as predicate, written as [**use value (value)**]. The second chapter

17 *Das Kapital*, Erster Band, Dietz Verlag Berlin 1962, S.56; *Capital*, vol. I, Progress Publishers Moscow 1965, p.39. Hereafter abbreviated as (S.56; p.39) in the present text.

on *exchange process* traces actual generation of money from exchange process ; each commodity owner endeavors to realize simultaneously both value and use value as subjects, trying to make both value and use value of other's commodity as predicates, written as **[value (use value) : use value (value)]**. Summarizing above, value and use value take symmetrical roles as

{1} Value form : [value (use value)]

{2} Commodity fetishism : [use value (value)]

{3} Exchange process : [{1} value (use value) : {2} use value (value)]

Notably, {3} Exchange process involves two factors of {1} Value form [value (use value)] and {2} Commodity fetishism [use value (value)]. Marx follows the development of value to capital from the three viewpoints {1}{2}{3} in particular order that constitutes circular system of *Capital* in symmetry, as to be proved in [9] of the present article.

The keyword 'symmetry' in *Capital* has been unread. In the third section on value form, Marx cites from Aristotle's *The Nicomachean Ethics*, 'There can be no exchange without equality, and no equality without commensurability (Kommensurabilität)' (S.73-74 ; p.59).¹⁸ The keyword has been concealed behind the English or German translation of commensurability (Kommensurabilität). Commensurability is in Greek *symmetria* (συμμετρία ; syn+metros). Symmetry has to be reconsidered in its original sense.

Marx's keyword of 'symmetry' in *Capital* contrasts with 'a-symmetry (Inkommensurabilität)' in Hegel's article 'Faith and Knowledge', as follows,

'Mutual inclusion between external existences [das Außereinandergehaltene], the incommensurable [Inkommensurable], or the difference as product in phenomenon is mutually equal in the final relationship, that is, in the infinity where the opposition is simultaneously discontinued, and the identity that is posited as being for itself (in number) in the relationship to the incommensurable is an infinity, or a nothingness ; however, not as these abstractions being for itself (in number), nor as parts existing without the whole, but according to what it is by itself, that is, it is posited in the limit, then the incommensurable is the true concept and the true identity of the whole and parts, and the affirmative infinity, or the actual infinity exists for intuitive or geometrical recognition. The idea of infinity is one of the most important in Spinoza's system'.¹⁹

It is clear above that Hegel criticizes Kant's rejection of any attempt to synthesize antinomy as semblance (Schein), when referred the Kantian keywords in his theory of antinomy of 'limits and the whole and parts' above. Hegel's method of mutual mediating of object and subject, reality and ideality, or finite and infinity solves Kantian antinomy. Hegel defines the incommensurable as the difference in finite to become to identity in infinity, that is, the commensurability (symmetry). Marx succeeds the idea. In commodity exchange, the difference between use values is incommensurable. However, private exchange of different use values as commodities brings them to infinity to abstract the difference into identity or commensurability. Commodity exchange brings commensurability (symmetry).

Exchange of goods begins with need for different use value. Then, there must be something equal among the different goods. That is why Aristotle writes, 'there can be no exchange without equality, and no equality without commensurability'. Then, how does commensurability emerges

18 Aristotle, *The Nicomachean Ethics*, translated by H. Rackham, Harvard University Press, 1934, p.286-287.

19 Hegel, op. cit., S.351 : English translation cited.

from difference of use value? Here Aristotle abandons further analysis. Marx advances to the solution of *mutual self-deception* or *arbitral connection of facts* (*Tatsachen*) by *speculation* of among goods owners. They unconsciously abstract value by negation (abstraction) of the difference of use value, thinking contrarily that goods has *originally value by nature*; that is, they inverse the result (value) of their abstraction into the preposition (value inside goods). Therefore, Marx writes that equality of different labor can not be possible without 'abstraction of actual difference [of use value (S.87–88; p.73). Abstraction of value proceeds behind that of use value (S.52; p.37). Now different goods stand in symmetry as exchangeable commodity. Different things become double attributed of the difference (use value) and the same (value) when speculation introduces common measure (sym+metros) into them. Symmetry is relationship in that different existences connect with each other through speculative equality that is abstracted from the very difference.

Marx's *Capital* starts from commodity exchange in symmetry. *Capital* constitutes system of commodity capital circuit $[C^{(v)} \cdots C]$. Therefore, *Capital* is in symmetry. The three elements of $\{1\}\{2\}\{3\}$ works to organize the symmetrical circular system as to be proved in [9].

7. Cause of Inverse of Right and Left in Mirror ²⁰

Now, next task is to detect 'symmetrical structure that is constant for transformation of its elements'. The structure is concealed in Marx's *Capital* for rhetorical reason against Proudhonism, and it has never been recognized in the history of *Capital* study.

Notably, term 'value mirror (Wertspiegel)' reads in the theory of value form at the beginning of *Capital*. Moreover in note 18 at the same page Marx writes, 'Man is not born with mirror (Spiegel).' (S.67; p.52) ²¹ Another German term 'Rückbeziehung' reads in the theory of value form in sense of 'reflection' (S.79; p.65). ²² The two terms and the note suggest that Marx thinks people in capitalist society have specific mirror. They unconsciously use other's commodity as mirror, including commodity of labor power. They reflect *abstract value* par excellence of their own commodity on *concrete use value* of others' commodity as its mirror, contrary to that usual mirror is *abstract* on that *concrete* figure reflects itself. Each use value of commodity is mirror to express value of other's commodity. Thus, commodity connects with each other, mutually letting other's use value as mirror to express value of their own commodity. Modern capitalism is multi-mirroring relationship. Marx states that equivalent form of value is form of reflection. That is, equivalent form reflects the value of relative form. The reflection implies returning back to the beginning, or progressing results in retrogressing. What reflects other comes back to itself or to what is reflected by other. The circular structure of mirror relationship bases continuity of capitalist reproduction.

Contemporary mathematics uses the term 'reflection' as topological sense. The German term for reflection is Spiegelung. Spiegel means mirror in German, so Spiegelung is literally 'mirroring'. To-

20 The following [7][8][9] are largely altered part of the author's article, 'Constant Symmetrical Structure of Marx's *Capital*', in *Critique ; Journal of Socialist Theory*, Issue No. 65, University of Glasgow, Routledge December 2013.

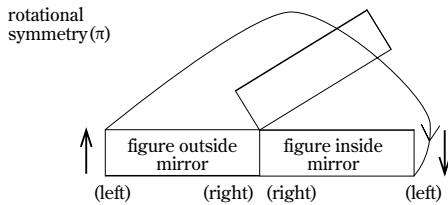
21 The German word 'Spiegel' (mirror) is translated 'a looking glass'. The translators does not understand Marx's metaphor.

22 The English translation of 'Rückbeziehung' is 'converse relation'; the appropriate is 'reflection (reflexion)'.

Figure II : Optical Illusion of Mirror and Reflection Theory of Value

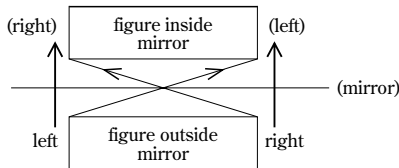
— Reason why right and left look inversed in mirror —

[Figure II-1] Figures inside and outside mirror

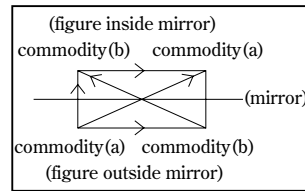


[Figure II-2] Right and left inversed in mirror

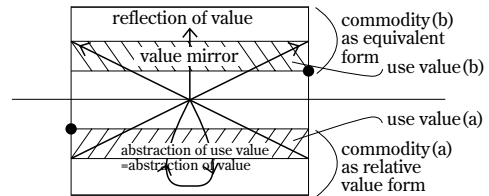
Figure outside mirror puts its own viewpoint on figure inside mirror : inverse symmetry



[Figure II-3] Commodity Exchange as Reflection



[Figure II-4] Value Form (I) as Mirror Reflection



Rotational symmetry locates use value(a) as relative form and use value(b) as equivalent form.

Inverse symmetry of use value(a, b) abstracts value.

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pology investigates structure that 'mirror relationship' organizes. Reflection (Spiegelung) constitutes topological system. It is Set that includes Elements both in interior and exterior of itself. Further, set becomes element of other set, and element transforms into set that includes other set as element. For Marx, such internal relation is the development of his theory of atom and emptiness in the 1841 dissertation. Now, consider further the interchangeable relationship of reflection in reference to **Figure II** at page 106.²³

As usually recognized, man has strange experience when he looks at mirror. The person outside the mirror reflects himself inside it. The figure in the mirror corresponds one by one to the person outside it. When he raises his left arm, the arm on the left side in the mirror also raises. However, at the same time, it seems to him that not left arm, but right arm does so. Right and left seem to inverse between inside and outside the mirror. What causes such inverse of right and left?

The fact is this. On one hand, the person outside the mirror shifts his own viewpoint to that of the figure inside the mirror ; that is, he operates *rotational symmetry* of his viewpoint of 180 degree or π ; as the result, from viewpoint of person outside the mirror, his left hand seems to exist in the mirror on the right side, as shown by FIGURE II-1. On the other, at the same time, the person outside the mirror projects his own viewpoint on the figure inside the mirror ; the projection operates

²³ Figure II and III are illustrated just for introductory explanation of re-reading Marx's *Capital* in the light of Group Theory ; they are the same in part respectively with their Japanese versions in the present author's article in *Jyokyo (Situation)* May-June 2013 issue and *Annual Report* of Senshu University Institute for Social Sciences, March 2014 issue, and with the English version in the author's article cited in note 20.

inverse symmetry of right and left. Now his left hand seems to exist on left side. Left hand of the person outside of the mirror seems to exist double on the right side and on the left side simultaneously. The optical illusion is caused by the unconscious double operation by the person of the symmetrical rotation of 180 degree and the inverse of right and left, as shown by FIGURE II-2.²⁴

8. Reflective Symmetry of Value Theory

Commodity exchange implies the same symmetry of mirror inverse (see upper picture on the right side of Figure II-3). Firstly, in exchange of commodity [a] and commodity [b], both of them face with each other. The relationship establishes itself by mutual operation of *rotational symmetry* of 180 degree by each commodity owner. Then, they examine whether or not the commodity of exchange partner has the same value with his own. Basing on the mutual evaluation, they exchange commodities. Now the owner of commodity [a] becomes the owner of commodity [b] and vice versa; that is *inverse symmetry*. Commodity exchange shares the same structure of mirror reflection that composes symmetry between inside and outside.

The theory of value form focuses on one side of commodity exchange between the two who form mutual relationship, in order to analyze structure of value expression of one commodity (see below picture on the right side of Figure II-4). The relationship in that commodity [a] faces to commodity [b] is equivalent to *rotational symmetry*. The relative form of value corresponds to the person outside the mirror, and equivalent form of value to the figure inside the mirror.

On preposition of the *rotational symmetry* between the two forms, the following two problems are solved from viewpoint of relative form of value, or from *outside* viewpoint of *inverse symmetry*; (1) what causes value of relative form to emerge, and (2) how the value is expressed. As to (1), Marx writes just after the head of *Capital*, 'the exchange of commodities is evidently an act characterized by a total abstraction from use value.' (S.52; p.37) The rear side of the abstraction of *use value* is that of *value*. What abstracts real existence of use value is nothing but unconscious value-generating speculation of commodity owner. Value is originally connected with use value.

Value is unconscious result of abstraction by the commodity owner. He rather mistake that value exists originally inside his own commodities. As to (2), value that is abstracted through mutual relationship of commodities makes use of use value of the opposite commodity as 'value mirror' (Wertspiegel) on that the value *reflects* (rückbeziehen) itself. Operation to equalize commodities with different kinds of use value [a] and [b] *abstracts* value. Next operation is to *express* the abstracted value [a] of relative form by use value [b] of equivalent form. The abstraction of value and its expression are operation by *inverse symmetry* of use value of different kinds [a] and [b] that are on preposition of *rotational symmetry*.

The theory of value form limits itself only to explanation how value of relative form is *ideally* expressed, while the theory of exchange process solves the problem of simultaneous *actual* realization both of value and use value. The latter theory analyzes how unexpected result comes out of struggle among all commodity *subjects* that endeavors to make all other commodities *predicate* on that to express its own value. The competition organizes chains of the second form of value, or the fourth

²⁴ As to optical illusion, see Jun Imai, Hiroaki Terao and Hiroaki Nakamura, *Constant and Symmetry*, Chikumashobo Publishers, 2013 Tokyo.

form in the first 1867 edition of *Capital*. If commodity of n kinds participates in the strife, the each has possibility of $1/n$ to become general equivalent or money. Therefore, the whole commodity world has the possibility $1/n \times n = 1$, that is, necessity of emergence of money. The commodity world necessarily has money. Money as the result of contradiction of exchange process expresses value of all other kind of commodity with gold (as Marx's preposition), and symmetrically, expresses its own value with all other kinds of use value. What reflects other reflects itself symmetrically on what are reflected. Such syllogistic structure is the world that theory of value and exchange process presupposes that implies 'symmetrical structure being constant for transformation of its elements'.²⁵

9. Unveiling Constant Symmetrical Structure of Marx's *Capital*²⁶

Lastly, the present article unveils concealed 'constant structure of rotational symmetry and inverse' of the 1867 first edition of Book One of *Capital*.

[I] Section (1) Commodity and Section (2) Commodity Exchange of Chapter One consist of three elements of {1} value form, {2} commodity fetishism and {3} exchange process. The order of {1} {2} {3} provides basic viewpoint of theoretical development of *Capital* and is determined to return to (reflect on) the very order itself by systematic replacements of the elements of the order of [I {1} {2} {3}].

[II] Section (3) Money or Commodity Circulation of Chapter One immediately follows Commodity Exchange. The first function of *ideal* money as *value measurement* of commodity to sell succeeds to *ideal expression of value* of {1} value form. The second *function* of *real* money as means of commodity circulation is compatible with {3} *real exchange process*. The last function of money is (a) hoarding of value in gold that is typical *fetishism*. (a) Hoarded money is applicable to (b) payment and develops to (c) world money. The third function of money corresponds to {2} commodity fetishism. The order is summed up as [II {1} {3} {2}].

[III] Next is Section (1) of Chapter Two on 'transformation of money into capital'. It presupposes {2} the world money in [II] and begins with consideration of the general formula of capital ($M-C-M'$). Section (2) of the same chapter discusses *contradiction* between equal exchange of labor power and unequal exchange that gains surplus value. Section (2) corresponds to {3} exchange process that solves *contradiction* between realization of value and that of use value. Section (3) proves that labor power is possible to *increase value* as surplus value. The section is compatible to {1} value form with that to *express value*. The order now replaces into [III {2} {3} {1}].

[IV] The following first half part of Section (1) of Chapter Three on labor process discusses that it is subsumed under capital and appears as 'productivity of capital', showing correspondence to {2} commodity fetishism, since any trans-historical phenomenon is appearance of economic value from Marx's historically self-limited viewpoint. Next is the last half part of the same chapter on *value-forming and value-increasing process* succeeds viewpoint of {1} value form. Last paragraphs of Sec-

²⁵ See Hiroshi Uchida, Value form as reproductive relation, *Senshu Economic Bulletin*, 1996, vol.31, no. 1.

²⁶ While in his article, 'Constant Symmetrical Structure of Marx's Capital' in *Critique, Journal of Socialist Theory*, December 2013, Issue No. 65, the present author has analyzed the structure in the fourth edition by Engels of Book One of *Capital*, here he changes the text to the first edition by Marx himself of Book One of *Capital*, in order to confirm the structure in Marx's original text.

tion (1) on unity of labor process and value-forming process take up *contradiction* between use value and value. That corresponds to {3} exchange process that solves the *contradiction* between simultaneous realization of use value and that of value. The order transforms into [IV {2} {1} {3}].

[V] Next Section (2) of Chapter Three on constant capital and variable capital investigates that consumption of use value of labor power brings *surplus value* that is more than that invested in it as 'variable capital' and, at the same time, produces new use value in product, transferring and maintaining the value of means of production as 'constant value'. The united function of labor power that produces value and use value is compatible with {3} exchange process as unity of value and use value. Section (3) on the rate of surplus value is discussion from viewpoint of value, that reflects on {1} value form. Section (4) on working day and Section (5) on the rate and mass of surplus value proves that consumption of labor power produces value more than that of labor power, while the process appears to produce just the same amount of value of labor power. That is developed phenomenon of {2} commodity fetishism. The order is shown as [V {3} {1} {2}].

[VI] Next is Chapter Four on relative surplus value. It is social result that is brought about by decrease of necessary labor time (*value*) to produce the same quantity of wage goods (*use value*) by increase of labor productivity among sectors that produce wage goods. Thus, the chapter corresponds to {3} exchange process that mediates use value and value.

The following Sections (1), (2) and (3) of Chapter Five on absolute and relative surplus value unveils that the two forms of surplus value conceal the origin of surplus value by mixing the source of surplus value of (a) extending the whole labor time and (b) shortening necessary labor time by labor productivity. Next Section (4) of the same chapter on wage also reveals that time wage and piece wage, especially the latter, hide the origin of surplus value, making wage form appear as real unit of one hour or one piece of product, as if that were equal to value produced in actuality. Thus, Chapters Five corresponds to {2} commodity fetishism.

While Part Three of Book Two of *Capital* proves social conditions of reproduction, Chapter Six of Book One on accumulation of capital develops why and how capital is *accumulated surplus value*, that corresponds to {1} value form. The order is shown as [VI {3} {2} {1}].

The six orders that constitute Book One of *Capital* are summarized as follows. Modes of their connection are shown in each bracket [].

Order I : {1} {2} {3} [rotational symmetry of VI {3} {2} {1}=I {1} {2} {3}]

Order II : {1} {3} {2} [inverse symmetry of I {2} {3}=II {3} {2}]

Order III : {2} {3} {1} [rotational symmetry of II {1} {3} {2}=III {2} {3} {1}]

Order IV : {2} {1} {3} [inverse symmetry of III {3} {1}=IV {1} {3}]

Order V : {3} {1} {2} [rotational symmetry of IV {2} {1} {3}]=V {3} {1} {2}]

Order VI : {3} {2} {1} [inverse symmetry of V {1} {2}=VI {2} {1}]

The rules shown inside [] regulate six orders. For instance, orders I and II constitute inverse symmetry of two elements {2} and {3} that are next to the first element {1}, as [I {2}{3}] and [II {3} {2}]. Order [II {1}{3}{2}] transforms into order [III{2}{3}{1}], changing the first element and the last. In the same way, both symmetry of rotation and inverse operate by turns. The last order [VI {3}{2} {1}] symmetrically rotates onto the first order [I {1}{2}{3}]. The last Chapter Twenty Four and Twenty Five on the primitive accumulation and the modern colonial system are reflections of the *logical progress* of the six orders on the *historical retrogress*. As seen previously, the coexistence in space guarantees the succession in time. Thus, the order as a whole reflects on itself or maintains

Figure III : Rotational Symmetry and Inverse Constitute Capital Circuit

Sr : Rotational Symmetry Si : Inverse Symmetry

I $1 \rightarrow 2 \rightarrow 3 = VI$ $3 \rightarrow 2 \rightarrow 1$ Sr

II $1 \rightarrow 3 \rightarrow 2 = I$ $1 \rightarrow 2 \rightarrow 3$ Si

III $2 \rightarrow 3 \rightarrow 1 = II$ $1 \rightarrow 3 \rightarrow 2$ Sr

IV $2 \rightarrow 1 \rightarrow 3 = III$ $2 \rightarrow 3 \rightarrow 1$ Si

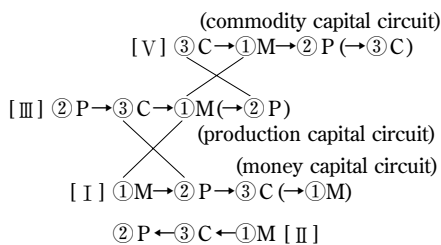
V $3 \rightarrow 1 \rightarrow 2 = IV$ $2 \rightarrow 1 \rightarrow 3$ Sr

VI $3 \rightarrow 2 \rightarrow 1 = V$ $3 \rightarrow 1 \rightarrow 2$ Si

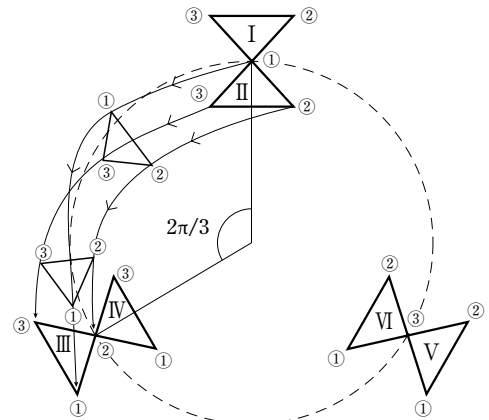
Rotational symmetry and inverse symmetry constitute capital circuit of three formulas.

[I] turns to [III] by way of [II].

[Abbreviation ① M : money, ② P : production
③ C : commodity]



[IV] and [VI] are omitted.



Transition from [II] $1 \rightarrow 3 \rightarrow 2$ to [III] $2 \rightarrow 3 \rightarrow 1$.

Rotation(π) of [II] on pivot of [II] $3-2$ brings [III].

The same with transition of [IV] to [V] and that of [VI] to [I].

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constant for transformations of its own elements of $\{1\}\{2\}\{3\}$.

As already mentioned in [6], unconscious operation of rotational symmetry and inverse causes optical illusion of inverse between right and left of figure inside mirror, and the same is with $\{1\}$ value form, $\{2\}$ commodity fetishism and $\{3\}$ exchange process. Moreover, as proved just above, the symmetrical operation of the two kinds organizes the whole system of Book One of Marx's *Capital* as a circular structure that maintains itself *constant* for transformation of its elements of $\{1\}\{2\}\{3\}$. Moreover, the two kinds of symmetry constitute capital circuit of three kinds as shown in FIGURE III at page 110. Each circular movement of money, production and commodity operates curve plane of two dimensions (see on right side of the figure).

Mathematically, the constant structure is isomorphic with set of elements in Group Theory that has six types of equilateral triangle as elements in regular permutation.²⁷ Projective geometry provides primary operation of two kinds.²⁸ Operation ϕ divides and exchanges the order of the second element and the third out of three elements with the first fixed, while operation ψ divides and exchanges the order of the first element and the third with the second fixed. Operation ϕ of the first order (I) $\{1\}\{2\}\{3\}$ changes into the second (II) $\{1\}\{3\}\{2\}$, and operation ψ of II $\{1\}\{3\}\{2\}$ into III $\{2\}\{3\}\{1\}$. In short, just as follows.

27 See Hiraku Toyama, *Introduction to the Contemporary Mathematics*, Chikumashobo, 2012, Tokyo, p.191ff, and Paul Alexandroff, *An Introduction to the Theory of Group*, trans. by Hazel Perfect and G. M. Peterson, Dover Publishers, Inc., New York, 2012, p.22f.

28 See Shokichi Yanaga and Tetsutaro Hirano, *Projective Geometry*, Asakurashoten Publishers, 1959, p.20f.

$\phi \text{ I } \{1\}\{2\}\{3\} \rightarrow \text{II } \{1\}\{3\}\{2\}$ [inverse symmetry]
 $\psi \text{ II } \{1\}\{3\}\{2\} \rightarrow \text{III } \{2\}\{3\}\{1\}$ [rotational symmetry]
 $\phi \text{ III } \{2\}\{3\}\{1\} \rightarrow \text{IV } \{2\}\{1\}\{3\}$ [inverse symmetry]
 $\psi \text{ IV } \{2\}\{1\}\{3\} \rightarrow \text{V } \{3\}\{1\}\{2\}$ [rotational symmetry]
 $\phi \text{ V } \{3\}\{1\}\{2\} \rightarrow \text{VI } \{3\}\{2\}\{1\}$ [inverse symmetry]
 $\psi \text{ VI } \{3\}\{2\}\{1\} \rightarrow \text{I } \{1\}\{2\}\{3\}$ [rotational symmetry]

As suggested by the epigraph at the head of the present article, reciprocal division and exchange of the three elements {1}, {2}, {3} by the operation ϕ and ψ genetically constitutes continuity of the six orders. The continuity founds capitalist reproduction. Marx's *Capital* implies Group Theory written economic terms. The symmetrical logic that is mediated with 'value' and 'use value' has its theoretical foundations on Marx's remarks at the head of *Capital* as his guiding thread, as already mentioned.

Marx must have started his critique of political economy in order to foresee in theory the end of capitalism. The most basic question to the symmetrical system of *Capital* is whether it will exist eternally or not. Relative surplus value implies the theoretical solution. It is actualized through competition among many capitals for 'extraordinary profit' that had been already recognized by Adam Smith as shown in Chapter Seven of Book One of *Wealth of Nations*. Marx's task is to seek economic cause of the extraordinary profit and its social consequence. Automatic machinery system brings not only relative surplus value, but also serious consequence in history. Finally, it limits itself unconsciously by eliminating living labor or the very source of surplus value, because capitalist mode of production is self-contradictory system of appreciation (Verwertung) through depreciation (Entwertung). Capitalism as seemingly everlasting value-increasing system that has pivot on the infinite point (P_{∞}) is destined to cease to exist because of its own successful development.